

BEHAVIORAL DIFFERENTIATION AND THE DIRECTION OF
EVOLUTION IN A SPECIES OF DROSOPHILA FROM THE
ISLAND OF HAWAII^{1,2}

KENNETH Y. KANESHIRO AND JOYCE S. KURIHARA
DEPARTMENT OF ENTOMOLOGY, UNIVERSITY OF HAWAII, MANOA
3050 MAILE WAY, HONOLULU, HAWAII 96822

Mate preference experiments were conducted to determine whether behavioral differences were present among six populations of Drosophila silvestris from the island of Hawaii. In nearly all pair-wise combinations studied, at least partial (asymmetrical) isolation was observed between reciprocal crosses; i.e., females from one population were less discriminant than females from the other. It has been hypothesized that the genetic basis of certain elements of the courtship behavior pattern in these species change (are lost) such that females of ancestral populations discriminate strongly against males of derived populations, while females of derived populations readily accept males of ancestral populations. Following such an hypothesis, the data obtained from this study provide a basis for inferring the direction of evolution among the six populations of silvestris. It would appear that the population on Hualalai is the oldest population, and from there, two separate lineages gave rise to the remaining five populations. One lineage provided progenitors for the south and west populations; i.e., at Pauahi and Kahuku. The second lineage involved an introduction from Hualalai to the Kohala Mountains and subsequent colonizations of the Piihonua and Olaa populations. When interpreted in this way, the behavioral studies appear to be a sensitive indicator of initial stages of the speciation process.

¹ABSTRACT

²Full paper published in Pacific Science 35:177-183.